



# Altech Chemicals Limited

## HPA: a “sapphire-hard” act to follow

**Altech Chemicals (ASX:ASX) is aiming to become one of the world’s leading suppliers of 99.99% (4N) high purity alumina (HPA).** HPA is a high value product (US\$40,000/t indicative market price in Japan) and forms the base for producing synthetic sapphire. Synthetic sapphire is used in the manufacture of substrates for LED lights, semiconductor wafers used in the electronics industry, and scratch-resistant sapphire glass used for wristwatch faces, optical windows and smartphone components. A new, potentially massive market for HPA (in powder form) is as a coating on Li-ion battery separators to improve battery thermal stability. **We calculate HPA demand increasing at a 17% CAGR between 2018E and 2025E, requiring the equivalent of 15.4x proposed ATC plants over the next seven years.**

A Final Investment Decision Study (FIDS) for ATC’s HPA Project was published in October 2017. The positive FIDS reported a mine life of 30 years (Meckering kaolin deposit, Western Australia), process plant (Johor state, southern Malaysia) capacity of 4,500tpa HPA, production costs of US\$9.90/kg HPA and a pre-tax NPV<sub>7.5</sub> of US\$505m.

ATC’s Project development plans are significantly advanced. Stage 1 construction (site clearance, piling) at the plant site in Malaysia commenced in August 2018. US\$190m (64% of pre-production capex) has been secured with German bank KfW IPEX-Bank, while ATC has secured a fixed price EPC contract with leading German engineering group SMS group, and a 10-year 100% offtake agreement with leading Japanese commodity trading and investment company Mitsubishi.

### Risk-weighted target price: A\$0.16ps. Upside potential.

Our base-case scenario assumes a mining inventory of 1.22Mt kaolin, equivalent to the estimated Mineral Reserves at Meckering, which supports a 30-year LOM. Predicated on a flat (real) HPA price environment of US\$25,000/t, and production costs in line with the FIDS estimate of just under US\$10,000/t, we forecast ATC’s HPA Project generating average post ramp-up revenues of A\$160m per annum and average post ramp-up EBITDA of ~A\$100m per annum (= EBITDA margin of 63%).

Our estimated post-tax NPV<sub>7.5</sub> for HPA Project is A\$711m. Adjusting for assumed project debt of A\$400m, our un-risked equity valuation is A\$315m (A\$0.52 per fully diluted share). Attaching a 70% project-risk discount – primarily because of poor visibility on the funding solution for the US\$110m balance of pre-production capex – we calculate ATC’s risk-adjusted equity value at A\$95m or A\$0.16 per diluted share. At current share price levels, we believe that ATC offers significant upside potential. **We initiate coverage with a Speculative Buy (Higher Risk) recommendation.** In addition, we see scope for a significant uplift to our A\$0.16ps target price.

- Our 70% risk-discount could largely unwind if ATC successfully and timeously secures the required funding balance.
- As a single commodity company, our valuation is particularly sensitive to the underlying HPA price environment. Our base-case scenario assumes a long-term (real) HPA price of US\$25/kg. In a 10% lower/higher HPA price environment, our valuation for ATC’s HPA Project decreases/increases by 18%. **At current market prices of US\$40/kg HPA, our NPV valuation for ATC’s HPA Project effectively doubles to ~A\$1.5Bn.**

31 October 2018

Share Price: A\$0.115

Target Price: A\$0.16

Recommendation  
**Speculative Buy**

Risk Assessment  
**Higher**

### Resources – High Purity Alumina (HPA)

David Brennan, CFA

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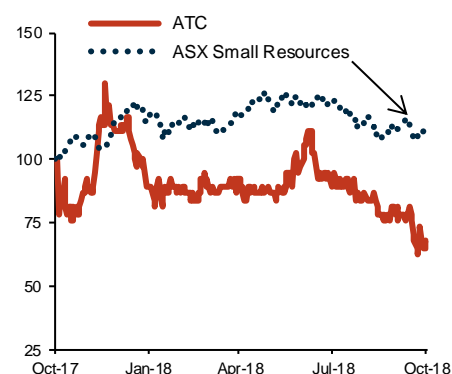
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### Altech Chemicals Limited

ASX Code	ATC
52- week range	A\$0.11-A\$0.27
Market Cap (A\$m)	63
Shares Outstanding (m)	573
Av Daily Turnover (shares)	1.4 million
ASX All Ordinaries	5,760
2019E BV per share (A\$)	0.08
2019E EPS (A\$)	-0.01
2019E Net Cash/(Debt) (A\$m)	14

### Relative price performance



Source: Iress

## Financial Statements

### Altech Chemicals Limited

Year ending June

Profit & Loss Statement (A\$m)	FY18A	FY19E	FY20E	FY21E	FY22E
Revenue (net of TC/RC)	0.0	0.0	0.0	0.0	37.8
Mining / logistics	0.0	0.0	0.0	0.0	(6.3)
Processing	0.0	0.0	0.0	0.0	(11.4)
Corporate/Royalty/Other	(3.6)	(4.0)	(5.0)	(7.0)	(8.2)
<b>EBITDA</b>	<b>(3.6)</b>	<b>(4.0)</b>	<b>(5.0)</b>	<b>(7.0)</b>	<b>12.0</b>
Depreciation & Amortisation	(0.0)	0.0	0.0	0.0	(2.5)
<b>Operating profit</b>	<b>(3.6)</b>	<b>(4.0)</b>	<b>(5.0)</b>	<b>(7.0)</b>	<b>9.5</b>
NOI	(1.0)	0.0	0.0	0.0	0.0
<b>EBIT</b>	<b>(4.7)</b>	<b>(4.0)</b>	<b>(5.0)</b>	<b>(7.0)</b>	<b>9.5</b>
Interest income	0.1	0.0	12.4	6.6	0.6
Interest expense	0.0	0.0	0.0	0.0	(10.0)
Tax expense	0.0	0.0	0.0	0.0	0.0
<b>Reported NPAT</b>	<b>(4.6)</b>	<b>(4.0)</b>	<b>7.4</b>	<b>(0.4)</b>	<b>0.1</b>
<b>Normalised NPAT</b>	<b>(3.5)</b>	<b>(4.0)</b>	<b>7.4</b>	<b>(0.4)</b>	<b>0.1</b>

EBITDA Margin (%)	na	na	na	na	32%
Operating profit margin (%)	na	na	na	na	25%
EPS Reported (A\$)	(0.01)	(0.01)	0.01	(0.00)	0.00
<b>EPS Normalised (A\$)</b>	<b>(0.01)</b>	<b>(0.01)</b>	<b>0.01</b>	<b>(0.00)</b>	<b>0.00</b>
EPS growth (%)	nm	nm	nm	-105%	-140%
DPS - Declared (A\$)	0.00	0.00	0.00	0.00	0.00
Avg. no. of fully-diluted shares (m)	363	601	601	601	601
YE no. of fully-diluted shares (m)	601	601	601	601	601

Cash Flow Statement (A\$m)	FY18A	FY19E	FY20E	FY21E	FY22E
EBITDA	(3.6)	(4.0)	(5.0)	(7.0)	12.0
Investment in working capital	(3.9)	0.1	0.0	0.0	(5.9)
Tax expense	0.0	0.0	0.0	0.0	0.0
<b>Operating Cash Flow</b>	<b>(7.5)</b>	<b>(3.9)</b>	<b>(5.0)</b>	<b>(7.0)</b>	<b>6.1</b>
Capex	(16.1)	0.0	(200)	(200)	(5.0)
Other investments	0.0	(2.1)	0.0	0.0	0.0
<b>Investing Cash Flow</b>	<b>(16.1)</b>	<b>(2.1)</b>	<b>(200)</b>	<b>(200)</b>	<b>(5.0)</b>
Net interest received / (paid)	0.1	0.0	12.4	6.6	(9.4)
Debt draw down / (repayment)	0.0	400	0.0	0.0	0.0
Dividends paid	0.0	0	0.0	0.0	0.0
Equity raised / (repaid)	18.4	20	0.0	0.0	0.0
<b>Financing Cash Flow</b>	<b>18.5</b>	<b>420</b>	<b>12.4</b>	<b>6.6</b>	<b>(9.4)</b>
Non-operating & Other	4.0	0.0	0.0	0.0	0.0
<b>Inc/(Dec) in Cash</b>	<b>(1.2)</b>	<b>414</b>	<b>(193)</b>	<b>(200)</b>	<b>(8.3)</b>

Balance Sheet (A\$m)	FY18A	FY19E	FY20E	FY21E	FY22E
Cash & Equivalents	0.3	414	222	21.3	13.0
Receivables	0.1	0.0	0.0	0.0	3.8
Inventories	0.0	0.0	0.0	0.0	2.8
Other Current Assets	0.0	0.0	0.0	0.0	0.0
PPE and Exploration & Development	34.4	34	234	434	437
Deferred tax asset	0.0	0.0	0.0	0.0	0.0
Other Non Current Assets	0.0	2.1	2.1	2.1	2.1
<b>Total Assets</b>	<b>34.7</b>	<b>451</b>	<b>458</b>	<b>458</b>	<b>459</b>
Payables and other current Liabilities	3.3	3.3	3.3	3.3	3.9
Short Term Debt	0.0	0.0	0.0	0	0
Long Term Debt	0.0	400	400	400	400
Other Liabilities (incl silver stream)	0.0	0	0	0	0
<b>Total Liabilities</b>	<b>3.3</b>	<b>403</b>	<b>403</b>	<b>403</b>	<b>404</b>
<b>Total Equity</b>	<b>31.4</b>	<b>47</b>	<b>55</b>	<b>55</b>	<b>55</b>
Net Cash / (Debt)	0.3	14.2	(178)	(379)	(387)

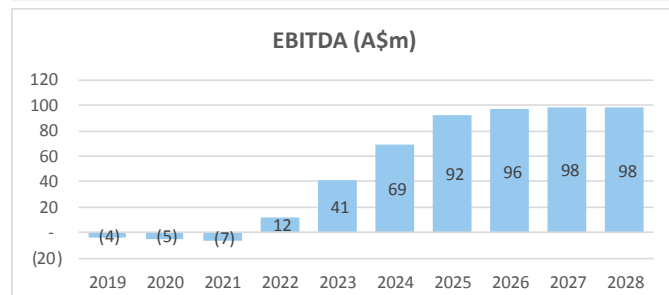
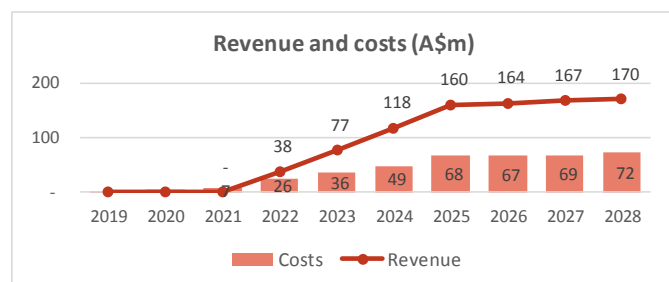
Substantial Shareholders	%	Date
SMS Investments	6.8%	
MMA Group Berhad	5.8%	Aug-18
HSBC Custody Nominees	5.5%	

Source: Company, IRESS, State One Stockbroking forecasts

HPA production and revenue	FY18A	FY19E	FY20E	FY21E	FY22E
Mill throughput (t kaolin ore)	na	0	0	0	10,702
HPA market price (US\$/kg)	na	25.0	25.5	26.0	26.5
.....customer discount (%)	na	5%	5%	5%	5%
HPA received price (US\$/kg)	na	23.8	24.2	24.7	25.2
AUD:USD exchange rate	na	0.75	0.75	0.75	0.75
HPA received price (A\$/kg)	na	31.7	32.3	32.9	33.6
HPA production (tonnes)	na	0	0	0	1,125
<b>HPA revenue (A\$m)</b>	<b>na</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>38</b>

Unit costs (US\$/kg HPA)	FY18A	FY19E	FY20E	FY21E	FY22E
Mining and loading	na	na	na	na	1.08
Processing	na	na	na	na	7.57
Logistics	na	na	na	na	3.10
<b>Operating costs</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>11.74</b>

### Longer-term forecast revenue, costs, EBITDA profile (FY19E-FY28E)



Leverage	FY18A	FY19E	FY20E	FY21E	FY22E
Debt (A\$m)	0	400	400	400	400
Net Debt/Equity	cash	cash	-325%	-695%	-708%
Interest Cover (x)	na	na	na	na	1.0

Valuation Ratios (x)	FY18A	FY19E	FY20E	FY21E	FY22E
Normalised P/E	na	na	9.3	na	487.4
Price/OP Cash Flow	-9	-18	-13.8	-9.9	11.4
Book value per share (A\$)	0.05	0.08	0.09	0.09	0.09
EV/EBITDA	-17	-12	-48	-63.1	37.5
ROE (%)	-11%	-8%	14%	-1%	0%

Valuation	(A\$m)	(A\$/share)	Comment
HPA Project Reserve (1.22M)	711	1.18	NPV
Resource outside of Reserve	4	0.01	Nominal
Enterprise value	715	1.19	
Project debt	(400)	(0.67)	
Equity value (unrisked)	315	0.52	Equity valuation - unrisked
<b>Risk discount</b>	<b>70%</b>		<b>Timing / financing / operational</b>
Equity value (risked) & target price	95	0.16	Equity valuation - risked

Note: Per share valuation based on 601 million shares (diluted)

## Valuation

### Estimated NPV for the HPA Project

Our estimated NPV<sub>7.5</sub> (un-risked) for the HPA Project is A\$711m.

Figure 1: NPV calculation

HPA Project NPV:  
A\$711m

Production Year	-	-	-	1	2	3	4	5	6	7	8-30	Project
Financial Year (end-June)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2051	Total
Revenue (net) (A\$m)	-	-	-	38	77	118	160	164	167	170	5,010	5,905
Costs - Mining and loading (A\$m)	-	-	-	(1.6)	-	-	(2.3)	-	-	(2.4)	(21)	(28)
Costs - Ore Processing (A\$m)	-	-	-	(11)	(23)	(35)	(48)	(49)	(50)	(51)	(1,505)	(1,774)
Costs - Logistics mine to plant (A\$m)	-	-	-	(5)	(5)	(5)	(8)	(9)	(9)	(9)	(261)	(309)
Costs - Admin/Corporate (A\$m)	(4.0)	(5)	(7)	(8)	(8)	(8)	(8)	(9)	(9)	(9)	(265)	(341)
Costs - Royalty (A\$m)	-	-	-	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(25)	(30)
Total costs (A\$m)	(4.0)	(5)	(7)	(26)	(36)	(49)	(68)	(67)	(69)	(72)	(2,077)	(2,481)
EBITDA (A\$m)	(4.0)	(5)	(7)	12	41	69	92	96	98	98	2,933	3,424
Tax (A\$m)	-	-	-	-	-	-	-	-	(24)	(24)	(704)	(751)
EAT (A\$m)	(4)	(5)	(7)	12	41	69	92	96	75	74	2,229	2,673
Equity funding (A\$m)	-	-	-	-	-	-	-	-	-	-	-	-
Debt funding (A\$m)	400	-	-	-	-	-	-	-	-	-	-	400
Project capex (A\$m)	-	(200)	(200)	-	-	-	-	-	-	-	-	(400)
Sustaining capex (A\$m)	-	-	-	(5)	(5)	(5)	(5)	(5)	(6)	(6)	(166)	(203)
Project cashflow (A\$m)	396	(205)	(207)	7	36	64	87	91	69	69	2,063	2,470
Discount rate	7.5%											
PV of cash flow (A\$m)	711											

Source: State One Stockbroking forecasts

Note: Our discount rate of 7.5% is the same as the discount rate employed by ATC in its financial models. Predicated on our assumption that the project is 100% debt funded, we suggest this (low) discount rate is not unreasonable. Our assumed pre-production capex of A\$400m based on ATC's FIDS capex estimate of US\$298m (October 2017).

### Target price, recommendation and risks

Adjusting for project debt we calculate ATC's **un-risked equity value at A\$315m** or A\$0.54 per diluted share. Attaching a 70% risk discount, we calculate ATC's **risked equity value at A\$95m** or A\$0.17 per diluted share. Our rationale for employing a deep discount is primarily due to the poor visibility on when ATC will obtain the A\$150m balance of pre-production capex (US\$298m as per October 2017 FIDS) or the cost and source of this funding - mezzanine debt, streaming facility, project sell-down / JV, equity raise, or some combination of the above.

Figure 2: Equity valuation and target price

	(A\$m)	(A\$ per share)	Comment
HPA Project Reserve (1.22Mt)	711	1.18	NPV
Meckering Resource outside of Reserve	4	0.01	Nominal
Enterprise value	715	1.19	
Project debt	(400)	(0.67)	
Equity value (unrisked)	315	0.52	
Risk discount	70%		Timing / financing / operational
Equity value (risked) & target price	95	0.16	Equity valuation - risked

Source: State One Stockbroking forecasts

At current share price levels, we calculate that ATC offers some 37% upside to our risk-adjusted target price. **We initiate coverage on Altech Chemicals with a Speculative Buy (Higher risk) recommendation.**

Target price:  
A\$0.16ps

Recommendation:  
Speculative Buy  
(Higher risk)

Risks to our earnings profile and target price include, but are not limited to:

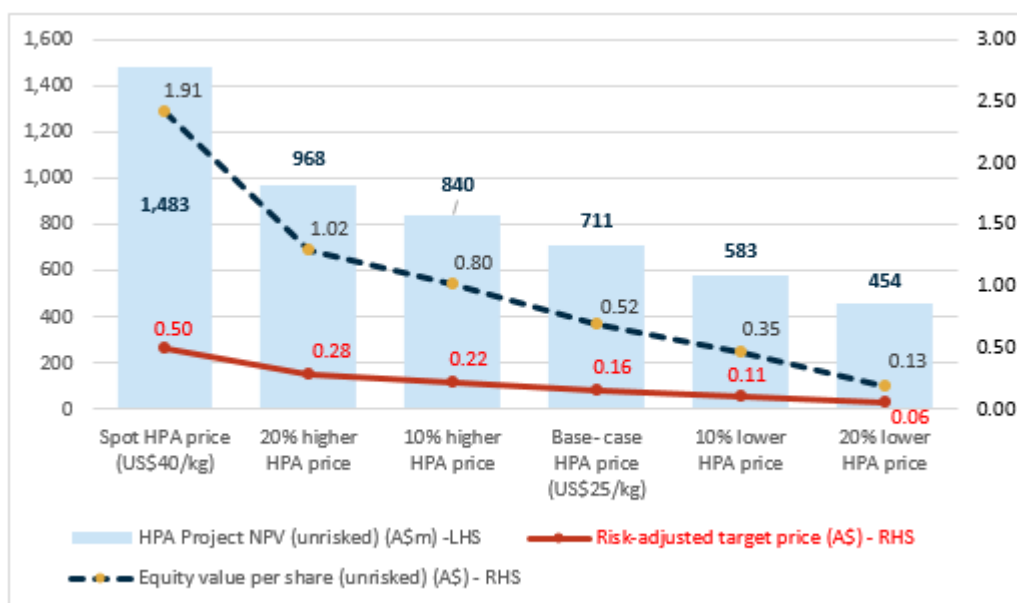
- US\$ HPA market price and AUD:USD exchange rate volatility.
- Grade volatility and/or lower than expected grades and estimated Reserve tonnage, ore body characteristics, and metallurgy and recovery rates at the processing plant.
- Plant construction start date (dependant on the timing of securing funding for the balance of project pre-production capex), commissioning schedule, production start-date and ramp-up profile.
- Offtake: ATC has secured 100% off-take for ten years with Mitsubishi. Offtake agreements will need to be secured for the balance of the 30-year project life-of-mine (LOM).
- Operating costs (particularly mining, logistics, processing).
- Sovereign risk: the processing plant location is in Malaysia. Changes in the regulatory / political environment in Malaysia could impact operating conditions and financial returns.
- Competition / new technology: Increased competition from new producers and/or from existing producers.
- Lower than expected demand for HPA due to substitution by alternative materials (SiC, Si, GaN) in making substrates for the LED industry (currently >50% of current HPA demand).

### Sensitivity to HPA prices (US\$/t)

Our base-case scenario assumes a long-term (real) HPA price of US\$25,000/t (US\$25/kg). Note: Our price forecast is significantly below the current indicated HPA price in Japan of US\$40,000/t, and is below ATC's FIDS long-term price forecast of US\$27,000/t. As such, we believe our base-case price assumption is on the conservative side.

In a 10% lower/higher HPA price environment, our valuation for ATC's HPA Project decreases/increases by 18%. **At current market prices of US\$40/kg, our valuation for the Project doubles to ~A\$1.5Bn.**

Figure 3: Sensitivity to HPA price



Source: State One Stockbroking forecasts

## Peer comparison

HPA is a relatively specialised, high-value, low-volume commodity. Nevertheless, domestic investors are fortunate to have four HPA developers listed on the ASX - Altech Chemicals (ASX:ATC), Hill End Gold (ASX:HEG), FYI Resources (ASX:FYI), and Collierina Cobalt (ASX:CLL).

HEG and FYI can be compared directly to Altech. The projects are all based on aluminous clay (kaolin) feed-ore and a hydrochloric acid (HCl) leach process. CLL is different; it is based on a nickel laterite which has lower grades of aluminium, and will use a counter current atmospheric leaching (CCAL) process to produce HPA along with co-products of scandium, nickel, cobalt, and manganese.

Altech has been through a four-year process of geology, mining, metallurgy, process plant location and environmental studies, approvals, permitting and third party due diligence, has secured US\$190m in debt funding, a 10-year customer offtake agreement, and a fixed price EPC contract with a leading construction and engineering firm (SMS group).

In contrast, HEG and FYI completed their PFSs on their respective projects in June and September 2018 respectively, while CLL is targeting to release its HPA PFS later this year.

If project development at HEG, FYI, and CLL follows a similar timeline to ATC, we suggest that they will not become development ready until late in 2021. Thus, we suggest that ATC remains the most advanced developer of the group, and the one most likely to be in apposition to take advantage of the projected upsurge in HPA demand over the next 5-10 years.

**Figure 4: ASX-listed companies with HPA projects**

Company Code	Altech Chemicals ATC	Hill End Gold HEG	FYI Resources FYI	Collierina Cobalt CLL
M*Cap (A\$m)	60	8.6	14.5	65
Project	Meckering	Yendon	Cadoux	Collierina
Deposit style	Kaolin (aluminous clay)	Kaolin (aluminous clay)	Kaolin (aluminous clay)	Nickel Laterite
Deposit location	Western Australia	Victoria	Western Australia	NSW
Reserve size	1.22Mt @ 30% Al <sub>2</sub> O <sub>3</sub>	-	2.89Mt @ 24.4% Al <sub>2</sub> O <sub>3</sub>	
Resource size	12.7Mt @ 29.5% Al <sub>2</sub> O <sub>3</sub>	3.68Mt @ 24.7% Al <sub>2</sub> O <sub>3</sub>	9.6Mt @ 23% Al <sub>2</sub> O <sub>3</sub>	16.3Mt @ 3.1% Al <sub>2</sub> O <sub>3</sub> (+ Ni, Co)
Proposed plant location	Malaysia	Victoria	Western Australia	? NSW
Study status	FIDS + development ready	PFS (June 2018)	PFS (Sept 2018)	PFS expected 4Q 2018
<b>Study outcomes</b>				
HPA production	4,500tpa	8,000tpa	8,000tpa	?10,000tpa
Project LOM	30 years	39 years	+50 years	-
Forecast HPA price	US\$27,000/t	US\$25,000/t	US\$24,000/t	-
Forecast HPA production costs	US\$9,900/t	US\$7,668/t	US\$6,467/t	-
Project capex	US\$298m	US\$271m	US\$179m	-
Average annual EBITDA	US\$76m	US\$133m	US\$128m	-
Project NPV	US\$505m P/T (7.5% discount)	US\$692m P/T (@ 10% discount)	US\$506m A/T (@ 10% discount)	-
<b>Financing / Other</b>				
Project financing	US\$190m secured with German KfW IPEX-Bank	-	-	-
Customer offtake	100% for 10 years with Mitsubishi			
Engineering	Fixed price EPC contract with German eng firm SMS group	-	-	-

Source: Companies, IRESS, compiled by State One Stockbroking



## HPA Project: operational assumptions

### Mining inventory

Our assumed mining inventory for the HPA Project equates to the 2016 estimated Mineral Reserves at Meckering (Western Australia) of 1.22Mt of kaolin @ 30% Al<sub>2</sub>O<sub>3</sub>.

**Figure 5: JORC Mineral Resource & Ore Reserve (2016)**

	Category	Quantity (Mt)	Yield (% of minus 300µm)	Minus 300µm Al <sub>2</sub> O <sub>3</sub> (%)
<b>Ore Reserve</b>	Proved	0.45	69	30.1
	Probable	0.77	71	30.0
	<b>Total</b>	<b>1.22</b>	<b>70</b>	<b>30.0</b>
<b>Mineral Resources</b>	Measured	1.5		30.0
	Indicated	3.3		30.0
	Inferred	7.9		29.1
	<b>Total</b>	<b>12.7</b>		<b>29.5</b>

Source: Company

### HPA production profile

Mining at the Meckering deposit - via standard open pit methods, mostly free digging using conventional excavators - will be contracted out and carried out in two (2) month campaigns every three (3) years with ore stockpiled at site. Dry kaolin ore will be loaded into standard 20ft shipping containers at the Meckering site in a two-man, year-round operation, road-hauled to Freemantle port and then shipped to ATC's processing plant in Malaysia.

We forecast maiden production in FY22E, assuming full project financing is obtained in FY19E and a two-year construction period. We assume HPA production ramping up from 1,100t in FY22E (~25% operating capacity) to the October 2017 FIDS production target of 4,500t in FY25E.

The 1.22Mt mining inventory at a post-ramp-up processing rate of 43,000tpa indicates a project life-of-mine (LOM) of ~30 years.



**Figure 6: Forecast HPA production**

Production Year				1	2	3	4	5	6	7	8-30	Project
Financial Year (end-June)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2051	Total
Mine inventory - opening ('000t)	1,220	1,220	1,220	1,220	1,125	1,125	1,125	1,000	1,000	1,000	-	-
Mine inventory - closed ('000t)	1,220	1,220	1,220	1,125	1,125	1,125	1,000	1,000	1,000	875	-	-
Ore mined ('000t)	-	-	-	95	-	-	125	-	-	125	875	1,220
Ore transported to HPA plant ('000t)	-	-	-	25	25	25	43	43	43	43	975	1,220
Ore processed ('000t)	-	-	-	11	21	32	43	43	43	43	985	1,220
Al grade (%)	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Al contained ('000t)	-	-	-	3.2	6.4	9.6	12.8	12.8	12.8	12.8	295	366
Recovery (%)	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	-
<b>HPA produced ('000t)</b>	-	-	-	<b>1.1</b>	<b>2.2</b>	<b>3.4</b>	<b>4.5</b>	<b>4.5</b>	<b>4.5</b>	<b>4.5</b>	<b>103</b>	<b>128</b>

Source: State One Stockbroking forecasts

## Forecast HPA price and AUD:USD exchange rate

With current global HPA demand at only 34,000tpa, market prices are - not unexpectedly - not screen traded; pricing is opaque and typically set between individual customers and suppliers. In early October 2018, ATC reported that at a three-day international rechargeable battery exhibition held in Osaka, Japan, several Japanese and South Korean buyers confirmed that the prevailing market price for the highest consistency and quality 4N HPA (99.99%), typically from Japan, was around US\$40,000/t (US\$40/kg). Mitsubishi - ATC's offtake partner - also reported this level of pricing.

Note: ATC assumes a (significantly lower) long-term sales price of US\$27,000/t in its financial models and feasibility / FID studies.

Our base-case HPA market price is lower still at US\$25,000/t (real) i.e., we escalate prices at 2%pa (equivalent to forecast long-term global inflation) to keep prices constant in real terms. In addition, we assume a 5% customer discount to market price in exchange for Mitsubishi assuming credit risk on sales.

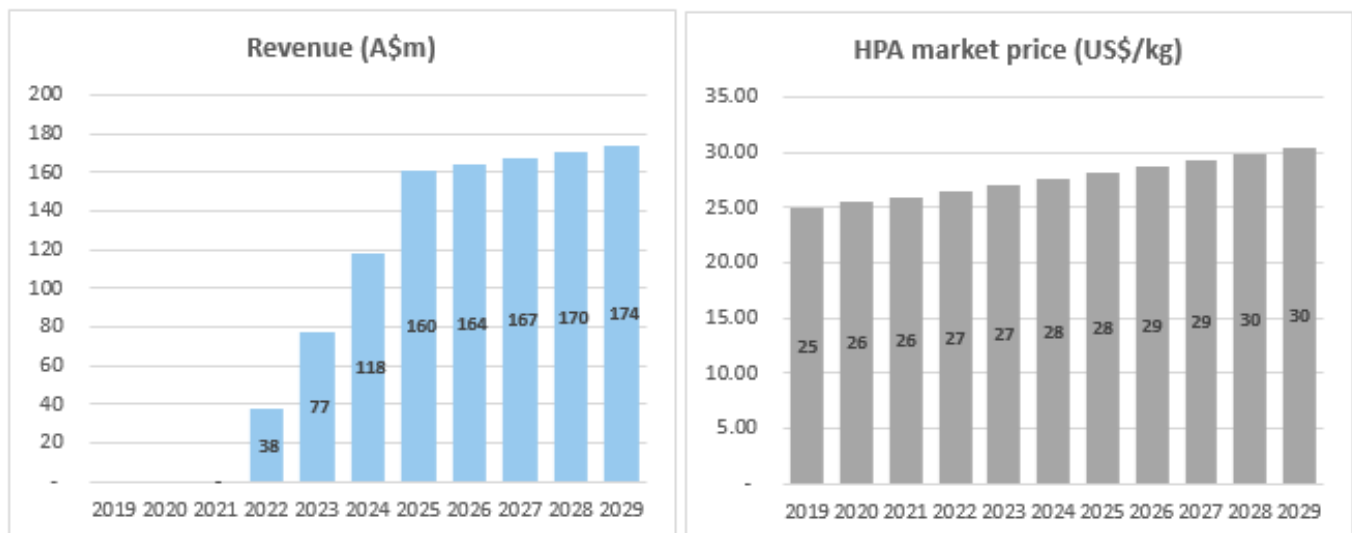
Over our 30-year forecast LOM, we assume a constant exchange rate of US\$0.75.

## Forecast revenue profile

Predicated on our forecast HPA production and HPA price profiles, we forecast HPA revenues increasing from A\$38m in FY22E - ATC's maiden production year - to an average of A\$160m (real) per annum. Note: ost an

**Figure 7: Forecast HPA revenue (FY19E- FY29E)**

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
HPA market price (US\$/kg)	25.00	25.50	26.01	26.53	27.06	27.60	28.15	28.72	29.29	29.88	30.47
.....customer discount (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
HPA received price (US\$/kg)	23.75	24.23	24.71	25.20	25.71	26.22	26.75	27.28	27.83	28.38	28.95
AUD:USD exchange rate	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
HPA received price (A\$/kg)	31.67	32.30	32.95	33.60	34.28	34.96	35.66	36.38	37.10	37.84	38.60
HPA production (tonnes)	-	-	-	1,125	2,250	3,375	4,500	4,500	4,500	4,500	4,500
HPA revenue (A\$m)	-	-	-	38	77	118	160	164	167	170	174



Source: State One Stockbroking forecasts

## Costs and Margin

Key cost assumptions include:

- Mining costs at Meckering mine: A\$8.00/t average waste/ore.
- Processing costs at Tanjung Langsat plant, Malaysia: US\$1,000/t ore (electricity, natural gas, hydrogen chloride (HCL), limestone).
- Logistics costs (Meckering mine to processing plant): ~A\$185/t ore.
- Corporate costs: A\$8m per annum in FY22E (maiden production).
- Western Australian royalties on unprocessed kaolin the equivalent of 0.3% of net revenue.
- Costs escalated at 2% pa.
- Malaysian corporate tax (24%) holiday for five (5) years from FY22E.

Note: costs are escalated at 2%pa.

Predicated on the above cost assumptions, we calculate production costs (mining, processing, logistics) in FY25E (first full year of production at 4,500tpa) of ~US\$9.80/kg HPA. This is in line with the ATC's forecast production costs of US\$9.90/kg HPA in the group's October 2017 FIDS. Including corporate and royalty expenses, we calculate all-in-costs at ~US11.35/kg HPA.

**Figure 8: Forecast revenue and costs**

Production Year	-	-	-	1	2	3	4	5	6	7	8-30	Project
Financial Year (end-June)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2051	Total
Revenue (net) (A\$m)	-	-	-	38	77	118	160	164	167	170	5,010	5,905
Costs - Mining and loading (A\$m)	-	-	-	(1.6)	-	-	(2.3)	-	-	(2.4)	(21)	(28)
Costs - Ore Processing (A\$m)	-	-	-	(11)	(23)	(35)	(48)	(49)	(50)	(51)	(1,505)	(1,774)
Costs - Logistics mine to plant (A\$m)	-	-	-	(5)	(5)	(5)	(8)	(9)	(9)	(9)	(261)	(309)
Costs - Admin/Corporate (A\$m)	(4.0)	(5)	(7)	(8)	(8)	(8)	(8)	(9)	(9)	(9)	(265)	(341)
Costs - Royalty (A\$m)	-	-	-	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(25)	(30)
Total costs (A\$m)	(4.0)	(5)	(7)	(26)	(36)	(49)	(68)	(67)	(69)	(72)	(2,077)	(2,481)
<b>EBITDA (A\$m)</b>	<b>(4.0)</b>	<b>(5)</b>	<b>(7)</b>	<b>12</b>	<b>41</b>	<b>69</b>	<b>92</b>	<b>96</b>	<b>98</b>	<b>98</b>	<b>2,933</b>	<b>3,424</b>
Tax (A\$m)	-	-	-	-	-	-	-	-	(24)	(24)	(704)	(751)
<b>EAT (A\$m)</b>	<b>(4)</b>	<b>(5)</b>	<b>(7)</b>	<b>12</b>	<b>41</b>	<b>69</b>	<b>92</b>	<b>96</b>	<b>75</b>	<b>74</b>	<b>2,229</b>	<b>2,673</b>

Assumptions	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
HPA market price (US\$/kg)	25	26	26	27	27	28	28	29	29	30	30
AUD:USD exchange rate	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

Meckering mine strip ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Mining cost waste/ore average (A\$/t)	8.0	8.2	8.3	8.5	8.7	8.8	9.0	9.2	9.4	9.6	9.8
Processing cost - (US\$/t ore)	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195	1,219
Logistics costs (total) (A\$/t ore)	na	na	na	186	189	193	197	201	205	209	213
.....ore to Freemantle (A\$/t)	70	71	73	74	76	77	79	80	82	84	85
.....shipping to Malaysia (US\$/t)	60	61	62	64	65	66	68	69	70	72	73
.....ore to HPA Plant (US\$/t)	45	46	47	48	49	50	51	52	53	54	55
Corporate costs/Admin/Marketing (A\$m)	(4)	(5)	(7)	(8)	(8)	(8)	(8)	(9)	(9)	(9)	(9)
WA state royalties (as % revenue)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Tax rate (%)	0%	0%	0%	0%	0%	0%	0%	0%	24%	24%	24%

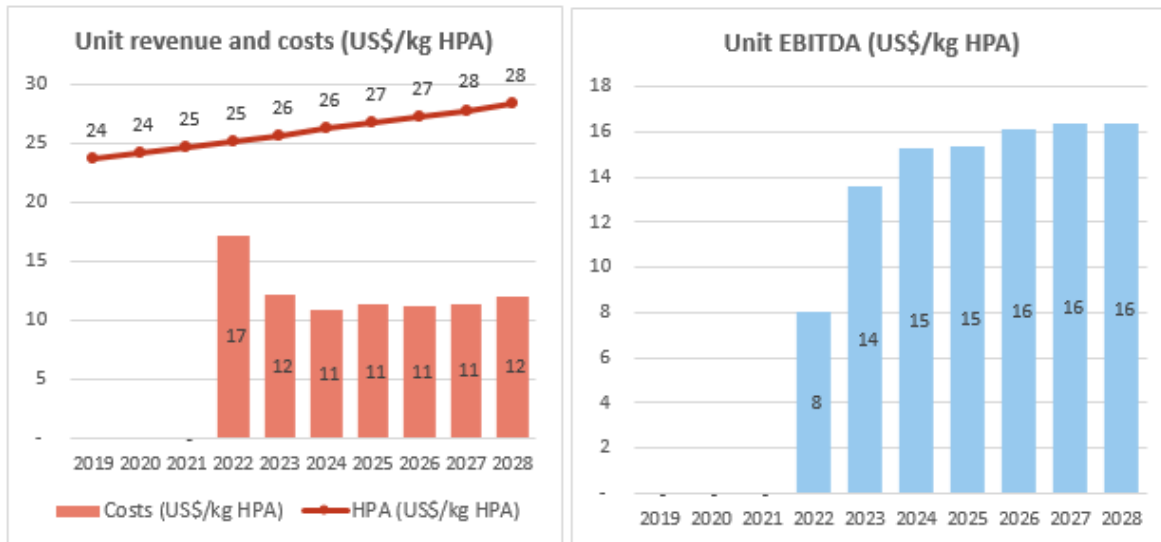
Source: State One Stockbroking forecasts



At forecast full capacity of 4,500t HPA in FY25E, and based on a forecast received price of US\$27/kg (rounded) and costs of US\$11/kg (rounded), we calculate a long-term average EBITDA margin of ~US\$16/kg (rounded).

**Figure 9: 10-year forecast unit revenue and costs (US\$/kg HPA)**

Unit Revenue and costs	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
HPA (US\$/kg HPA)	24	24	25	25	26	26	27	27	28	28
Costs (US\$/kg HPA)	-	-	-	17	12	11	11	11	11	12
EBITDA (US\$/kg HPA)	-	-	-	8	14	15	15	16	16	16

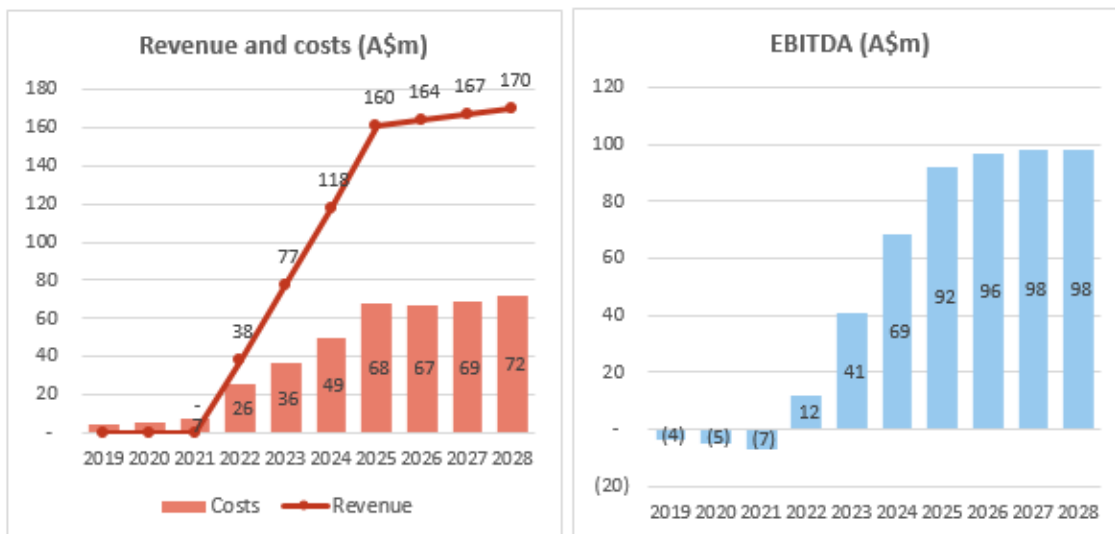


Source: State One Stockbroking

**Our revenue and costs assumptions point to ATC's HPA Project generating attractive annual EBITDA of just under \$100m (post ramp-up).**

**Figure 10: 10-year forecast revenue, costs, and EBITDA (A\$m)**

Revenue and costs (A\$m)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenue	-	-	-	38	77	118	160	164	167	170
Costs	4	5	7	26	36	49	68	67	69	72
EBITDA	(4)	(5)	(7)	12	41	69	92	96	98	98



Source: State One Stockbroking forecasts

## HPA: an in-demand commodity

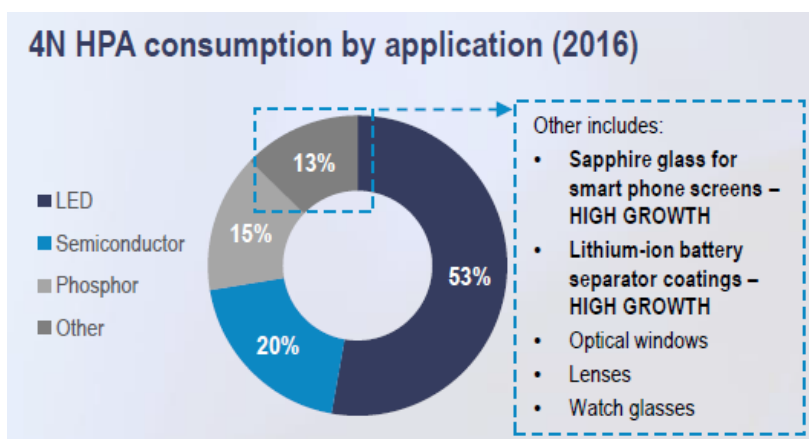
High purity alumina (HPA) is a white, granular chemical - a pure form of aluminium oxide ( $\text{Al}_2\text{O}_3$ ). At present, the key use of HPA is in the manufacture of synthetic sapphire. Synthetic sapphire is primarily used in the manufacture of substrates for LED (light-emitting diode) semiconductors, and semiconductor wafers used in the consumer electronics industry.

Synthetic sapphire is also used to manufacture scratch-resistant sapphire glass for high-end watches, lenses, smartphone screens, and optical windows. HPA is also used in the manufacture of phosphors / luminescent materials.

A new emerging opportunity for HPA demand is in the lithium-ion battery sector. HPA coated lithium-ion battery separator sheets greatly increase the integrity of the separator, allowing the Li-ion battery to operate at higher temperatures and increase overall battery safety. In addition, HPA is increasingly being directly applied as an outer coating layer onto the anode (+ve) and cathode (-ve) materials used in the Li-ion battery.

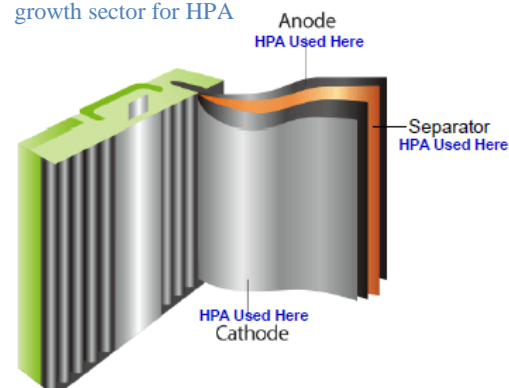
The >99.99% purity HPA market (estimated at ~34,000tpa in 2018) consists of two main product variants: 4N HPA (99.99% purity, US\$40,000/t), and 5N and 6N HPA (>99.999% purity, +US\$50,000/t). ATC is focusing on the 4N HPA market which accounts for ~75% of the market.

**Figure 11: HPA applications**



Source: Company

Li-ion batteries - viewed as a new high-growth sector for HPA



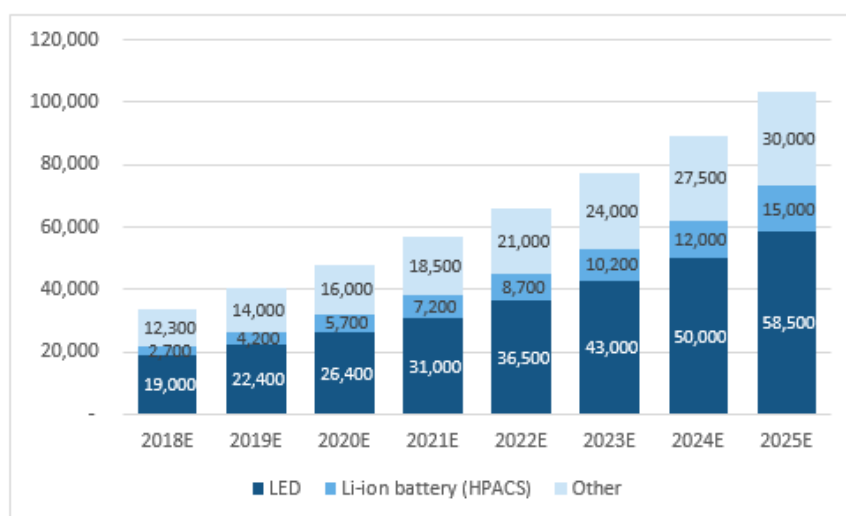
Historical demand growth for HPA has been driven by the increase in demand (often regulatory) for energy-efficient LEDs. Looking ahead, the LED-market is expected to remain a key driver for HPA demand with forecast LED CAGR of ~17% between 2016-2024 (source: ATC). Demand is also forecast to remain highly concentrated within the APAC region, driven by China, Japan, and South Korea which collectively account for over 40% of current global LED production.

Predicated on a 17% CAGR for LED HPA demand, we forecast LED consumption of HPA increasing from (an estimated) 19,000t in 2018 to 58,500t in 2025. Preliminary estimates of HPA demand for Li-ion battery separator coatings (HPASC) from market analysts and industry participants vary widely, but point to a very significant increase from current levels of 2,700tpa. We assume 15,000tpa HPASC demand by 2025 - which is at the conservative end of current estimates.

Predicated on 14% CAGR for Other (semiconductors, phosphors, screens) HPA demand, we calculate total HPA demand could increase by ~200% over the next seven years from 34,000 in 2018 to 103,500t in 2025 (implying 17% CAGR in total HPA demand).

**Figure 12: Forecast HPA demand to 2025**

HPA demand (tonnes)	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	CAGR (%)
LED	19,000	22,400	26,400	31,000	36,500	43,000	50,000	58,500	17%
Li-ion battery (HPACS)	2,700	4,200	5,700	7,200	8,700	10,200	12,000	15,000	28%
Other	12,300	14,000	16,000	18,500	21,000	24,000	27,500	30,000	14%
<b>Total</b>	<b>34,000</b>	<b>40,600</b>	<b>48,100</b>	<b>56,700</b>	<b>66,200</b>	<b>77,200</b>	<b>89,500</b>	<b>103,500</b>	<b>17%</b>
YoY increase in demand (tonnes)		6,600	7,500	8,600	9,500	11,000	12,300	14,000	
Cumulative increase in demand (tonnes)		6,600	14,100	22,700	32,200	43,200	55,500	69,500	
Equiv. number of Altech plants (x)		1.5	3.1	5.0	7.2	9.6	12.3	15.4	



Source: Company, State One Stockbroking forecasts

Our forecast demand profile indicates demand increasing by 69,500tpa by 2025; we note that this is equivalent to 15.4 ATC plants (of 4,500tpa HPA capacity). In addition, with ATC's plant forecast to ramp up to 100% utilisation only in FY25E, we suggest that ATC's operations will not have a material impact on the overall HPA supply/demand balance.

The existing supply of HPA – largely through the chemical treatment of aluminium metal – is dominated by large diversified chemicals companies i.e., (Sumitomo (Japan), Hebei, Zibo, Xuan Cheng (China), Sasol (South Africa), and is highly concentrated in the APAC region (>80%).

Importantly, HPA revenue generally contributes a relatively low proportion of total revenue for these diversified companies (< 5% for Sumitomo Chemicals). Thus, it is unlikely that large producers will make significant investment to increase the production capacity and meet the forecast demand increase.

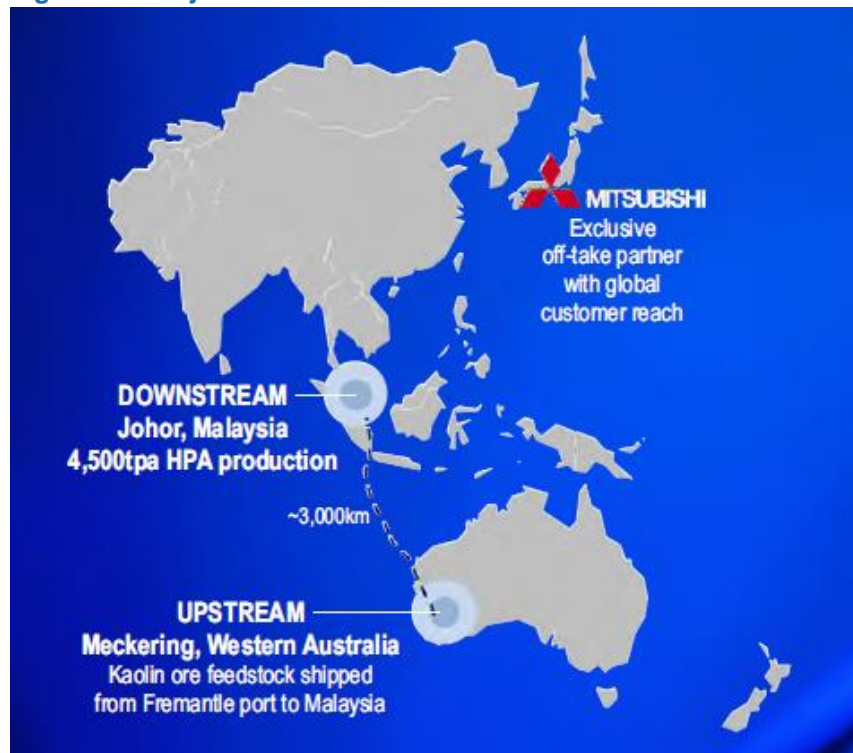
As a result, we believe that there is a significant opportunity for speciality or focused HPA producers to bridge this looming supply shortage – and particularly for those suppliers like ATC with lower processing costs that use alternative feedstock such as low-impurity kaolin.

## HPA Project - Overview

ATC's HPA Project consists of the fully-permitted kaolin (aluminous clay) mine at Meckering, Western Australia, and a proposed HPA plant at the Tanjung Langsat Industrial Complex in Johor state, southern Malaysia. The official ground-breaking ceremony marking the commencement of stage 1 construction (site clearance, pilings) was held in August 2018.

- In October 2017, ATC secured a US\$280m fixed price EPC contract with leading German firm SMS group that guarantees throughput volume and quality (4,500tpa for 4N (99.99%) HPA) including commissioning responsibility. SMS demonstrated its commitment to the project via a US\$15m equity investment in ATC.
  - In December 2017, ATC secured US\$190m in senior debt funding from the German government owned KfW IPEX-Bank (US\$170m export credit finance, US\$20m commercial debt).
  - In May and June 2018 respectively, ATC received an indicative non-binding mezzanine debt term sheet for US\$90m from a global merchant bank and an indicative non-binding streaming facility term sheet for US\$60m from a global investment group. Both proposals are subject to lenders due diligence - currently underway.
  - ATC is concurrently investigating alternative financing options including equity issue(s) and/or a possible JV partner via a partial project sell-down.
- In April 2016, ATC signed a 10-year exclusive sales and distribution agreement with Mitsubishi for 100% of ATC's output.

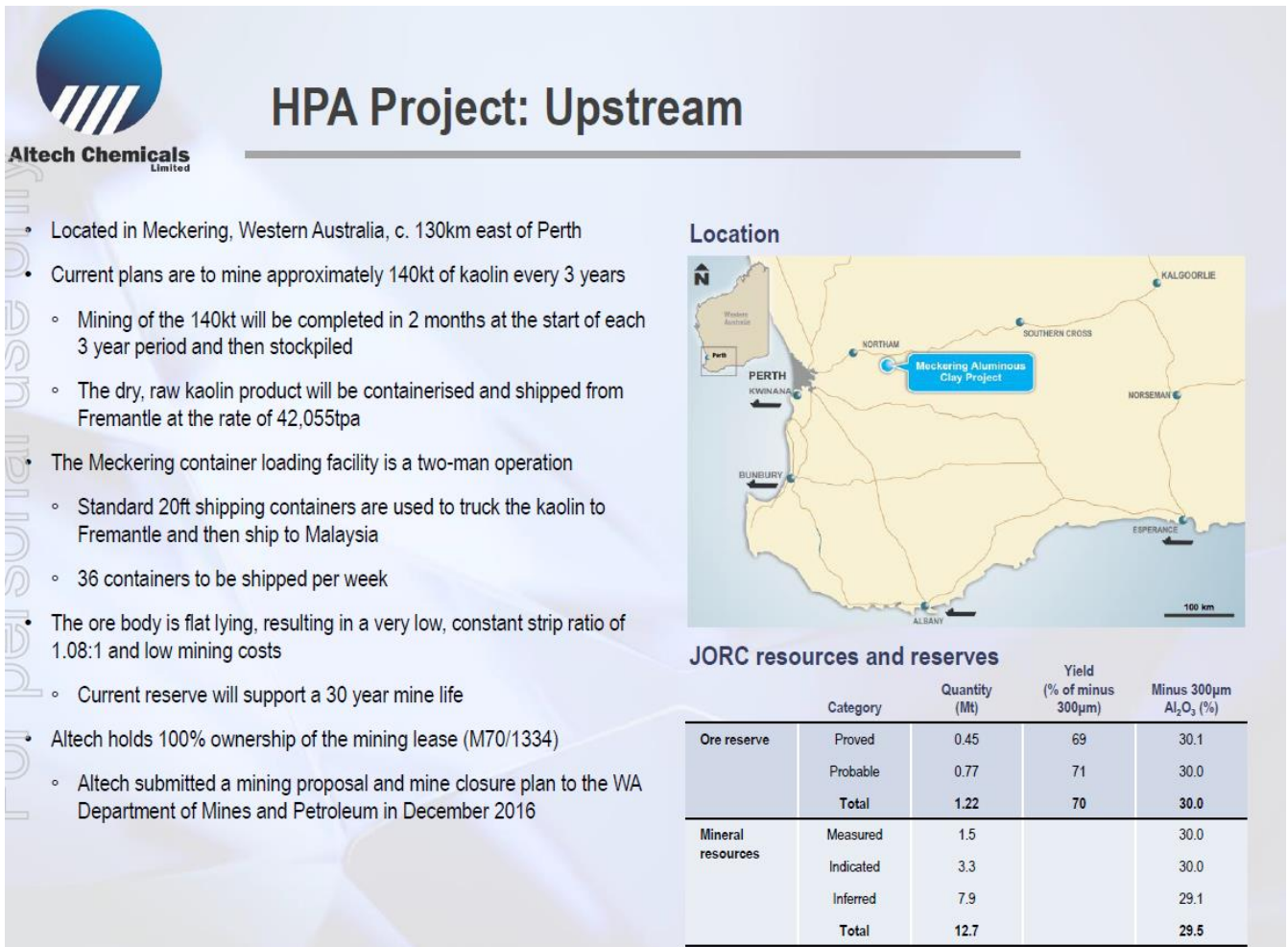
**Figure 13: Project locations**



Source: Company

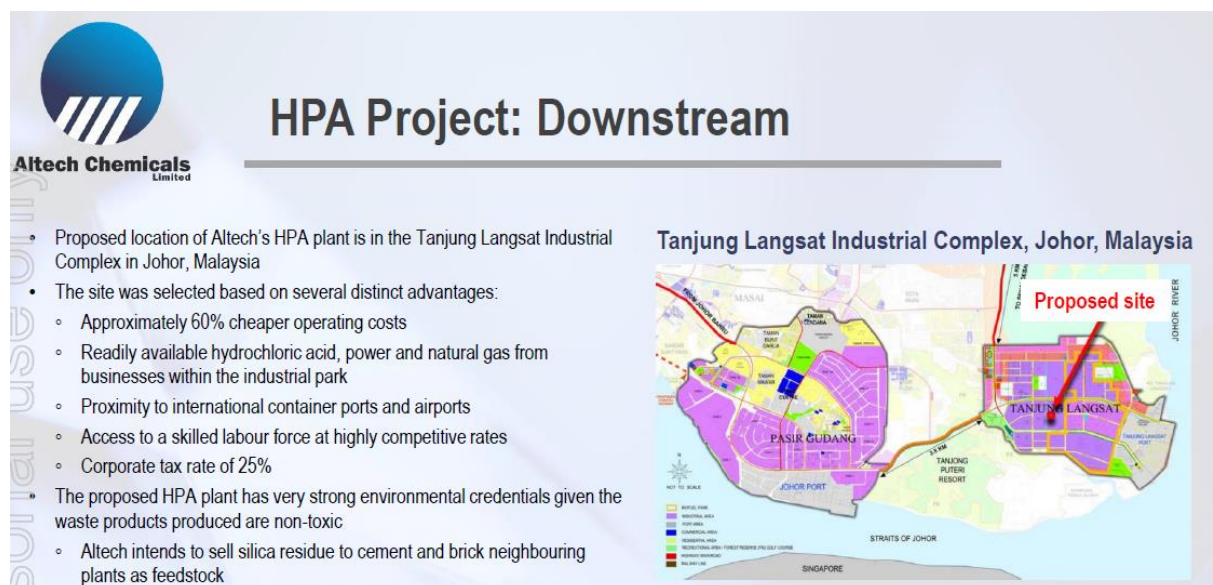


Figure 14: Upstream operation



Source: Company

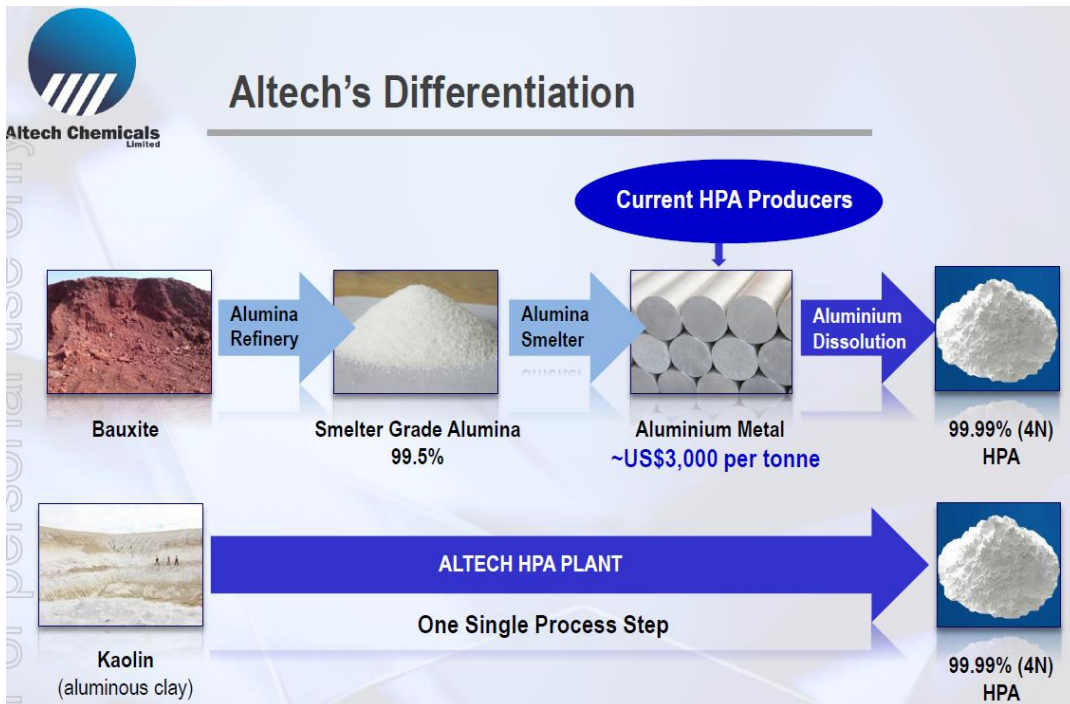
Figure 15: Downstream operation



Source: Company

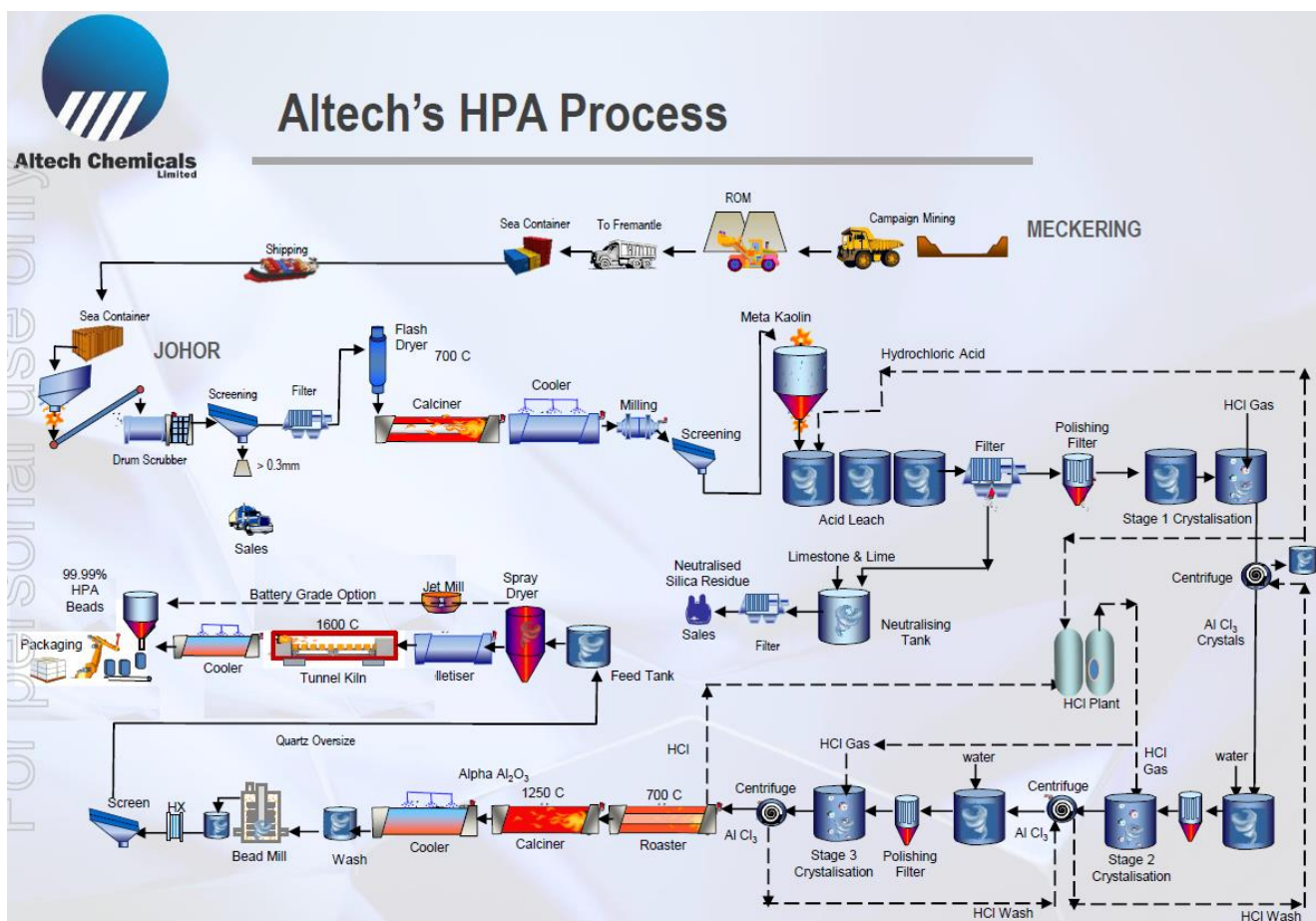


Figure 16: Altech's differentiation



Source: Company

Figure 17: Altech's HPA process



Source: Company

## Non-Executive Chairman and Managing Director Profiles

Source: Company website



### **Luke Frederick Atkins LLB**

Non-Executive Chairman

Mr Atkins is a lawyer by profession and one of the founders of the company. Mr Atkins brings to the board extensive experience in the areas of mining, exploration, and corporate governance. Mr Atkins is also Non-Executive Director of the successful ASX listed mining and exploration company, Bauxite Resources Ltd (BRL). Mr Atkins formerly held the role of Executive Chairman of BRL after co-founding the company in 2007. He has played a key role in BRL third party negotiations to successfully access funding, joint venture partnerships, land and infrastructure.

Mr Atkins has had extensive experience in capital raisings and has held a number of executive and non-executive directorships of private and publicly listed companies including a number of mining and exploration companies.



### **Iggy Tan B.Sc MBA GAICD**

Managing Director

Mr Tan is a highly experienced mining and chemical executive with a number of significant achievements in commercial mining projects such as capital raisings, funding, construction, start-ups and operations. Mr Tan has over 30 years' chemical and mining experience and been an executive director of a number of ASX-listed companies. He holds a Master of Business Administration from the University of Southern Cross, a Bachelor of Science from the University of Western Australia and is a Graduate of the Australian Institute of Company Directors.

Mr Iggy Tan became the Company's managing director in August 2014. He is responsible for managing and implementing the next stage of the Company's strategic business objectives, which includes the commercialisation of the high purity alumina (HPA) project. Having been involved in the commissioning and start-up of seven resource projects in Australia and overseas, including high purity technology projects, Mr Tan is an accomplished project builder and developer.

Mr Tan previously held the positions of managing director of Nickelore Limited, Galaxy Resources Limited and Kogi Iron Limited. At Galaxy Mr Tan was responsible for the capital raising, construction and start-up of the company's Mt Cattlin spodumene mine (\$80m) and the Jiangsu lithium carbonate plant (\$100m), which resulted in Galaxy becoming the world's leading producer of high purity lithium carbonate. The Jiangsu plant was eventually sold for \$260m in 2014.

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